



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/733,815	03/30/2001	Andrew T. Hunt	51006-2 (3535-35-00) DIV	6225

7590 07/02/2002

John J. Piskorski  
c/o EDWARDS & ANGELL, LLP  
Dike, Bronstein, Roberts & Cushman, IP Group  
130 Water Street  
Boston, MA 02109

EXAMINER

THOMAS, ERIC W

ART UNIT

PAPER NUMBER

2831

DATE MAILED: 07/02/2002

12

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/733,815

Applicant(s)

HUNT ET AL.

Examiner

Eric W Thomas

Art Unit

2831

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 37-68 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 37-68 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                  | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)           |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>8</u> . | 6) <input type="checkbox"/> Other:  |

## DETAILED ACTION

### *Specification*

An application in which the benefits of an earlier application are desired must contain a specific reference to the prior application(s) in the first sentence of the specification or in an application data sheet (37 CFR 1.78(a)(2) and (a)(5)).

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### *Claim Objections*

2. Claim 50 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 48 already claims a first foil metal layer (see claim 48, line 6).

### *Claim Rejections - 35 USC § 112*

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 40-41, 48-61 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 40 recites the limitation "said second metal foil" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 40 is confusing. If applicant is trying to claim (consistent with the specification) a second electrode formed on the dielectric, how can the dielectric material have an exposed surface?

Claim 48 recites the limitation "the metal foil" in line 6. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 37-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lauffer et al. (US 5,027,253) in view of Fisher (US 4,996,097).

Lauffer et al. disclose a layered structure for forming a thin layer capacitor comprising a copper metal foil (col. 12 lines 29-35), and a dielectric material

deposit on the foil (see col. 10 lines 45-47) having a thickness of from about 100 angstroms to about 10 microns thick.

Lauffer et al. do not disclose the metal foil has an exposed surface and the dielectric material layer having an exposed surface.

Fisher illustrates in fig. 1, an intermediate capacitor laminate formed by depositing a dielectric (1) onto a copper foil (2) wherein the copper foil has an exposed surface and the dielectric has an exposed surface. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form a capacitor intermediate wherein a dielectric is formed on a copper foil wherein the copper foil has an exposed surface and the dielectric material layer has an exposed surface, since such a modification would allow the capacitor intermediate to be used in another system other than a printed circuit board.

Regarding claim 38, Lauffer et al. disclose the claimed invention except for the dielectric is formed from a silica material. (It should be noted that the Lauffer reference is not limited to a specific type of dielectric material, see col. 8 lines 5-10). 100% Silica is a well known dielectric material used in the capacitor art. It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the dielectric layer from 100 % silica, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding claim 39, Lauffer et al. disclose the metal is a copper material (see example).

Regarding claim 39, Lauffer et al. disclose the metal is a copper material (see example).

Regarding claim 40, as best understood, Lauffer et al. disclose a second metal layer is deposited on the dielectric.

Regarding claim 41, as best understood, Lauffer et al. disclose the metal foil can be 36 microns thick (see example)

Regarding claim 42, Lauffer et al. disclose the claimed invention except for the dielectric material layer is formed from a  $\text{SrTiO}_3$ . . (It should be noted that the Lauffer reference is not limited to a specific type of dielectric material, see col. 8 lines 5-10).  $\text{SrTiO}_3$  is a well known dielectric material used in the capacitor art. It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the capacitor dielectric from a  $\text{SrTiO}_3$ , since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding claim 43, Lauffer et al. disclose the dielectric is a barium titanate (see example).

Regarding claim 44, Lauffer et al. disclose the claimed invention except for the dielectric material layer is formed from a material selected from  $\text{WO}_3$ ,  $\text{SrO}$ , mixed tungsten strontium oxides, and  $\text{BaWO}_4$ . (It should be noted that the Lauffer reference is not limited to a specific type of dielectric material, see col. 8 lines 5-10). These dielectric materials are well known dielectric materials used in the capacitor art. It would have been obvious to one having ordinary skill in the

art at the time the invention was made to form the capacitor dielectric from one material selected from the group  $\text{WO}_3$ ,  $\text{SrO}$ , mixed tungsten strontium oxides, and  $\text{BaWO}_4$ , since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding claim 45, Lauffer et al. disclose the dielectric material is an oxide that contains an element Ta (see example).

Regarding claim 46, Lauffer et al. disclose the claimed invention except for the first metal layer has a surface roughness on the side of the dielectric material layer of at least about  $1.1 \text{ cm}^2/\text{cm}^2$ . It is well known in the capacitor art to roughen the surface area of the metal foil on the side of the dielectric material (would enhance adhesion and mechanical bonding, and increase the surface area of the electrode). It would have been obvious to one having ordinary skill in the art at the time the invention was made to roughen the surface of the foil to  $1.1 \text{ cm}^2/\text{cm}^2$ , since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 47, Lauffer et al. do not expressly state the dielectric material is lossy having an electrical conductivity value of from  $10^{-1}$  to about  $10^{-5}$  amperes per  $\text{cm}^2$ . The dielectric is formed from the same claimed dielectric material having the same thickness. The dielectric material inherently is lossy having an electrical conductivity value of from  $10^{-1}$  to about  $10^{-5}$  amperes per  $\text{cm}^2$ .

Regarding claim 48, Lauffer et al. disclose a layered structure for forming a thin layer capacitor comprising a copper metal foil (col. 12 lines 29-35), and a dielectric material deposit on the foil (see col. 10 lines 45-47) having a thickness of from about 100 angstroms to about 10 microns thick (col. 2 line 5-19) wherein the dielectric material contains a cation other than the metal from which the copper foil is formed, and a second metal layer formed on the dielectric layer.

Lauffer et al. do not disclose the first metal foil and the second metal layer both have an exposed surface.

Fisher illustrates in fig. 2, an intermediate capacitor laminate is formed by disposing a dielectric (1) onto a copper foil (2) wherein the copper foil has an exposed surface and a second metal layer is formed on the dielectric layer wherein the first and the second metal layers each have an exposed surface. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form a capacitor intermediate wherein a dielectric is formed on a copper foil wherein the copper foil has an exposed surface and the second metal layer having an exposed surface, since such a modification would allow the capacitor intermediate to be used in another system other than a printed circuit board.

Regarding claims 49 & 55, Lauffer et al. disclose the claimed invention except for the dielectric is formed from a silica material. (It should be noted that the Lauffer reference is not limited to a specific type of dielectric material, see col. 8 lines 5-10). 100% Silica is a well known dielectric material used in the capacitor art. It would have been obvious to one having ordinary skill in the art at



the time the invention was made to form the dielectric layer from 100 % silica, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding claim 50, Lauffer et al. disclose the first metal layer is a foil (see example).

Regarding claim 51, Lauffer et al. disclose the metal is a copper foil (see example).

Regarding claim 52, Lauffer et al. disclose the first metal layer is a metal foil and the second metal layer is a metal layer deposited on the dielectric material layer.

Regarding claim 53, Lauffer et al. disclose the foil is between about 12 and about 110 microns thick (see example) and the second metal layer is between about 0.5 and about 3 microns thick (see col. 6 lines 64-68).

Regarding claim 54, as best understood, Lauffer et al. disclose (in fig. 3) the first metal layer is a coating on a polymeric sheet (305 b). The thickness of the metal layer can be 3 microns (see col. 6 lines 65-68 & col. 7 lines 10-60).

Regarding claim 56, Lauffer et al. disclose the claimed invention except for the dielectric material layer is formed from a  $\text{SrTiO}_3$ . . (It should be noted that the Lauffer reference is not limited to a specific type of dielectric material, see col. 8 lines 5-10).  $\text{SrTiO}_3$  is a well known dielectric material used in the capacitor art. It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the capacitor dielectric from a  $\text{SrTiO}_3$ , since it

has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding claim 57, Lauffer et al. disclose the dielectric material is barium titanium oxide (see example).

Regarding claim 58, Lauffer et al. disclose the claimed invention except for the dielectric material layer is formed from a material selected from WO<sub>3</sub>, SrO, mixed tungsten strontium oxides, and BaWO<sub>4</sub>. (It should be noted that the Lauffer reference is not limited to a specific type of dielectric material, see col. 8 lines 5-10). These dielectric materials are well known dielectric materials used in the capacitor art. It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the capacitor dielectric from one material selected from the group WO<sub>3</sub>, SrO, mixed tungsten strontium oxides, and BaWO<sub>4</sub>, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding claim 59, Lauffer et al. disclose the dielectric is an oxide that contains Ti (see example).

Regarding claim 60, Lauffer et al. disclose the claimed invention except for the first metal layer has a surface roughness on the side of the dielectric material layer of at least about 1.1 cm<sup>2</sup>/cm<sup>2</sup>. It is well known in the capacitor art to roughen the surface area of the metal foil on the side of the dielectric material (would enhance adhesion and mechanical bonding, and increase the surface

area of the electrode). It would have been obvious to one having ordinary skill in the art at the time the invention was made to roughen the surface of the foil to  $1.1 \text{ cm}^2/\text{cm}^2$ , since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 61, Lauffer et al. do not expressly state the dielectric material is lossy having an electrical conductivity value of from  $10^{-1}$  to about  $10^{-5}$  amperes per  $\text{cm}^2$ . The dielectric is formed from the same claimed dielectric material having the same thickness. The dielectric material inherently is lossy having an electrical conductivity value of from  $10^{-1}$  to about  $10^{-5}$  amperes per  $\text{cm}^2$ .

8. Claims 62-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elderbaum (US 4,008,514).

Elderbaum discloses in col. 5 lines 13-20, a (intermediate) layered structure for forming a thin layer capacitor comprising a flexible polymer support sheet, an un-patterned form on the flexible polymer support sheet, the first metal layer being release-able from the support sheet, the metal being a copper material (see col. 4 line 10), a dielectric layer formed on the un-patterned first metal layer, and a second metal layer formed on the flexible polymer support sheet, the metal is a copper material (see col. 4 line 10), the second metal layer (intermediate) having an exposed surface.

Elderbaum does not disclose the thickness of the dielectric layer being between about 0.03 and about 2 microns thick. It is known in the art to

increase/decrease the thickness of a dielectric layer of a capacitor to adjust the capacitance. It would have been an obvious matter of design choice to form the dielectric layer of Elderbaum with a thickness of 2 microns since such a modification would have involved a mere change in the size of a component, a change in size is generally recognized as being within the level of ordinary skill in the art. *In re. Rose*, 105 USPQ 237 (CCPA 1955).

Regarding claim 63, Elderbaum discloses the claimed invention except for the dielectric material contains 100% Silica. 100% Silica is a well-known dielectric material used in the capacitor art. It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the dielectric layer from 100 % silica, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Regarding claim 64, Elderbaum disclose the claimed invention except for the dielectric material layer is formed from a SrTiO<sub>3</sub>. SrTiO<sub>3</sub> is a well known dielectric material used in the capacitor art. It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the capacitor dielectric from a SrTiO<sub>3</sub>, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Regarding claims 65 & 68, Elderbaum disclose the claimed invention except for the dielectric material layer is formed from a BaTiO<sub>3</sub>. BaTiO<sub>3</sub> is a well known dielectric material used in the capacitor art. It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the capacitor dielectric from a BaTiO<sub>3</sub>, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416. (Regarding claim 68, the dielectric is formed from the same claimed dielectric material having the same thickness. The dielectric material inherently is lossy having an electrical conductivity value of from  $10^{-1}$  to about  $10^{-5}$  amperes per cm<sup>2</sup>)

Regarding claim 66, Elderbaum disclose the claimed invention except for the dielectric material layer is formed from a material selected from WO<sub>3</sub>, SrO, mixed tungsten strontium oxides, and BaWO<sub>4</sub>. These dielectric materials are well known dielectric materials used in the capacitor art. It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the capacitor dielectric from one material selected from the group WO<sub>3</sub>, SrO, mixed tungsten strontium oxides, and BaWO<sub>4</sub>, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding claim 67, Elderbaum disclose the claimed invention except for the first metal layer has a surface roughness on the side of the dielectric material

layer of at least about  $1.1 \text{ cm}^2/\text{cm}^2$ . It is well known in the capacitor art to roughen the surface area of the metal foil on the side of the dielectric material (would enhance adhesion and mechanical bonding, and increase the surface area of the electrode). It would have been obvious to one having ordinary skill in the art at the time the invention was made to roughen the surface of the first metal layer to  $1.1 \text{ cm}^2/\text{cm}^2$ , since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

### ***Double Patenting***

9. Applicant is advised that should claim 49 be found allowable, claim 55 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

### ***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

6,207,522 – parent patent.

6,270,835 – patent similar to present application.


4,604,676 – dielectric thickness.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric W Thomas whose telephone number is (703) 305-0878. The examiner can normally be reached on Monday-Friday 6:00 AM-6:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dean Reichard can be reached on 703-308-3682. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-1341 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

ewt  
June 5, 2002

  
DEAN A. REICHARD  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800